BLUE GRASS AND LOON PIT ANGLER CREEL SURVEY AND LARGEMOUTH BASS SURVEY

2004 Fish Management Report

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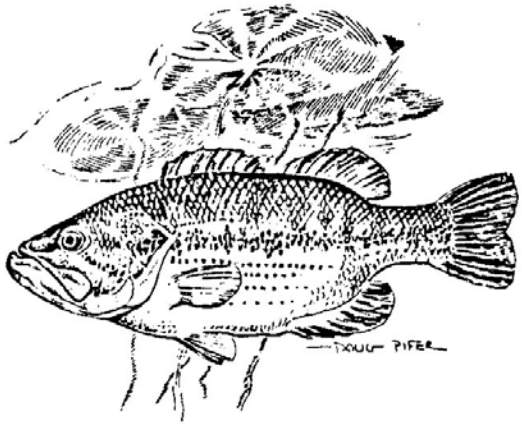

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2005

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Warrick County

2004

INTRODUCTION

Blue Grass Pit (173-acres) and Loon Pit (206-acres) are reclaimed strip pits located at Blue Grass Fish and Wildlife Area. The Fish and Wildlife Area was acquired by the Department of Natural Resources, Division of Fish and Wildlife (DFW) in August of 2000. The property consists of 2,532 acres of reclaimed coal strip mined ground which contains 28 pits totaling approximately 600 acres. The property is located in northwest Warrick County about one mile east of Interstate 164. Due to flooding from nearby Pigeon Creek and Blue Grass Creek, Blue Grass and Loon Pit contain "river" fish species that are not normally found in lakes. Both pits are connected by a 36-inch culvert pipe. Boat access is provided by ramps located on the north and south end of each pit. A 14-inch largemouth bass minimum size limit and a five bass bag limit was in effect from 2000 to February 1, 2003. An 18-inch largemouth bass minimum length limit and two bass bag limit were enacted on February 1, 2003.

The angler creel survey and largemouth bass survey were conducted to evaluate fishing pressure, angler opinion, and the new largemouth bass regulations.

METHODS

ANGLER CREEL SURVEY

The angler creel survey was conducted by a single clerk from March 15 through November 8, 2004. The creel clerk worked a total of 169 days, split up between both pits (84 days at Blue Grass Pit and 85 days at Loon Pit). Ten days out of every 14-day period were sampled, including every weekend day. The clerk worked either a morning (6:00 a.m. to 1:30 p.m.) or afternoon shift (1:30 p.m. to 9:00 p.m.). Since fishing pressure is typically higher in the afternoon, 75% of the sampling was conducted during the afternoon periods. Count data was taken five times a shift from a boat that was driven across the pit.

Boat and shore anglers were interviewed when the count was completed. Typical information obtained from angler interviews included fishing trip length, the number of anglers in the fishing party, species sought by anglers, numbers and lengths of fish harvested by species, number of largemouth bass caught and released, and county of residence. Largemouth bass catch and release totals were categorized into less then 18 inches and greater than or equal to 18 inches. All anglers interviewed were asked; "Are you in favor of the 18-inch largemouth bass length limit?", "Are you in favor of the two bass bag limit?", "Where you satisfied with your fishing trip?", and "Would you be in favor of a muskie stocking program in this lake?". The creel clerk measured each harvested fish to the nearest 0.5 inch.

The yield by weight estimate for largemouth bass was determined by weights taken during the largemouth bass survey in 2004. Yield by weight estimates for other species were determined using district average weights. Harvest estimates were obtained by using the DFW standard small lake angler creel survey program developed by Stuart Shipman and modified by Larry Koza.

LARGEMOUTH BASS SURVEY

The largemouth bass survey was conducted from April 15 through 27, 2004. Water temperature and conductivity were recorded. Sampling consisted of four hours of pulsed DC night electrofishing at each pit. Two individuals collected fish stunned by the electrofishing boat. The electrofishing boat booms and electrode dropper arrangement were modified to more effectively stun fish in the highly conductive water. One boom with three electrode droppers made from ¼ inch stainless steel rigging cable was used as the anode. The second boom was used as the cathode with the standard arrangement of droppers.

RESULTS

BLUE GRASS PIT

ANGLER CREEL SURVEY

An estimated 941 anglers fished approximately 20,051 hours (115.90 hours per acre) from March 15 through November 8, 2004 (Table 1). The highest fishing pressure occurred in June (21.57 hours per acre) followed by May (18.62 hours per acre) and July (17.61 hours per acre). The lowest fishing pressure occurred in October (6.43 hours per acre).

Table 1. Estimated number of anglers, hours of fishing pressure, and overall harvest rates by month at Blue Grass Pit, 2004.

Month	Number of Anglers	Fishing pressure (hours)	Harvest Rate (fish/hour)
March	15	371	0.09
April	148	3,026	0.18
May	181	3,221	0.12
June	152	3,731	0.11
July	128	3,046	0.02
August	119	2,800	0.11
September	114	2,398	0.09
October	73	1,112	0.64
November	11	345	0.92
Totals	941	20,051	0.15

The overall harvest rate was 0.15 fish per hour. The highest harvest rate was in November (0.92 fish per hour), followed by October (0.64 fish per hour), and April (0.18 fish per hour). The lowest harvest rates were in March and September (0.09 fish per hour). The total catch rate (harvested fish plus caught and released bass) was 0.51 fish per hour.

The total estimated harvest was 2,982 fish that weighed 1,294.31 pounds (Table 2). Crappie comprised 93% of the harvest by number followed by channel catfish (3%), bluegill (3%), and largemouth bass (< 1%). Crappie accounted for 72% of the harvest by weight followed by channel catfish, largemouth bass, and bluegill.

Table 2. Estimated numbers and pounds of fish harvested at Blue Grass Pit, 2004.

Species	Harvest by Number	Percent of Total	Harvest by Weight (lbs)	Percent of Total	Average Length (in)
Crappie	2,780	93.2	932.35	72.0	8.8
Channel catfish	94	3.2	290.45	22.4	18.1
Bluegill	94	3.2	14.11	1.1	5.9
Largemouth bass	14	0.5	57.40	4.4	20.0
Totals	2,982		1,294.31		

A total of 2,780 crappie was harvested that weighed 932.35 pounds. They ranged in length from 7.0 to 14.0 inches and averaged 8.8 inches. Fourteen percent of the crappie harvested were at least 10.0 inches long (Appendix A).

Ninety-four channel catfish were harvested that weighed 290.45 pounds. They ranged in length from 13.0 to 27.0 inches and averaged 18.1 inches. Nearly 60% of the channel catfish were at least 20.0 inches long.

An estimated 94 bluegill and 14 largemouth bass were also harvested. The bluegill ranged in length from 5.0 to 7.0 inches and weighed 2.14 pounds. One 20 inch largemouth bass was observed of the estimated 14 harvested and it weighed 4.10 pounds.

An estimated 7,319 largemouth bass were caught and released. Bass less than 18 inches accounted for 99% of the total. May and June had the highest catch and release totals at 1,601 and 1,271. October recorded the lowest catch and release total of 459.

Largemouth bass were the most sought after species at Blue Grass Pit (Figure 1). Thirty-seven percent of the respondents targeted largemouth bass followed by anglers indicating they were fishing for “anything” (32%), crappie (17%), channel catfish (9%), and bluegill (5%).

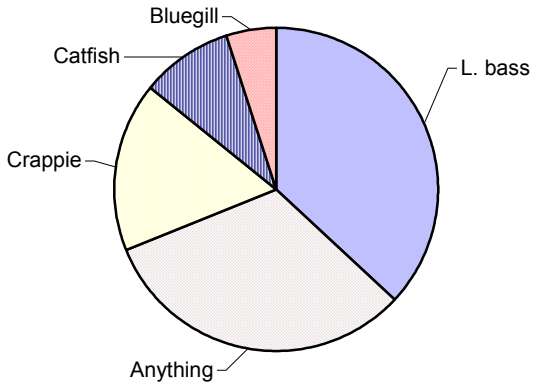

Figure 1. Fish species preferred by Blue Grass Pit anglers.

Anglers from 20 of Indiana's 92 counties fished at Blue Grass Pit during the creel period (Table 3). The majority of the anglers resided in Vanderburgh (62%) and Warrick (25%) Counties. Less than 4% of the anglers resided in each of the other 18 counties. Non-residents accounted for 1% of the anglers.

Table 3. Origin of anglers interviewed at Blue Grass Pit, 2004.

County	No.	%
Vanderburgh	312	62.4
Warrick	123	24.6
Gibson	18	3.6
Posey	13	2.6
St. Joseph	8	1.6
Non-resident	5	1.0
Pike	3	0.6
Hamilton	2	0.4
Knox	2	0.4
Lake	2	0.4
Scott	2	0.4
Daviess	1	0.2
Dubois	1	0.2
Harrison	1	0.2
Howard	1	0.2
Jackson	1	0.2
Randolph	1	0.2
Starke	1	0.2
Vigo	1	0.2
Wabash	1	0.2
White	1	0.2

At the end of the interview, the clerk asked each party four questions. The responses to each question are as follows.

1. Are you in favor of the 18-inch largemouth bass length limit?

   Eighty-four percent of the anglers were in favor, 16% were not in favor, and less than 1% did not respond to the question.

2. Are you in favor of the two bass bag limit?

   Eighty-three percent of the anglers were in favor, 16% were not in favor, and 1% did not respond to the question.

3. Were you satisfied with your fishing trip?

   Eighty-two percent of the anglers were satisfied, 6% were not satisfied, and 12% did not respond.

4. Would you be in favor of a muskie stocking program at Blue Grass Pit?

   Fifty-eight percent of the anglers would be in favor, 21% would not be in favor, and 21% did not respond.

Fishing related expenditures such as, bait, tackle, food, license fee's, lodging, and transportation represent a monetary value for the Blue Grass Pit fishery. The average cost for a fishing trip in Indiana was $36.56 per angler day in 2001 (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce, and U.S. Census Bureau, 2001). The $36.56 average was used for determining the economic value of Blue Grass Pit's fishery. The estimated 941 anglers that fished the lake during the creel period represented an economic value of $34,402.96 for the fishery.

LARGEMOUTH BASS SURVEY

A total of 519 largemouth bass was collected that ranged in length from 3.5 to 20.7 inches and weighed 153.79 pounds. The largemouth bass electrofishing catch rate was 129.5 per hour. Previous electrofishing catch rates for bass were 30.0 (2000) and 62.0 per hour (2001) (these catch rates are lower due to summer sampling). Growth has decreased for ages 1 through 4 since 2001 and is currently at the district average for all ages (Figure 2). The most substantial growth change was found in age 1 and 2 bass, which are now 1 inch shorter than they were in 2001. Largemouth bass average weights were considered normal when compared to district averages.

The largemouth bass proportional stock density (PSD) was 13. This is an improvement from the 2001 PSD of 5. The suggested range of PSDs for largemouth bass indicating a healthy balanced fishery is 40 to 70 (Anderson and Neumann 1996). An increase in PSD indicates a higher proportion of largemouth bass that are 12 inches or longer in the population.

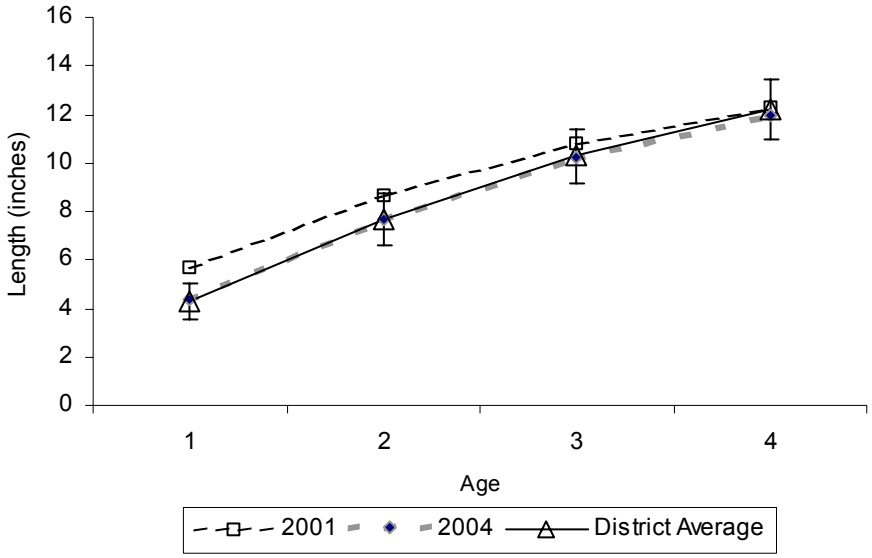

Figure 2. Blue Grass Pit largemouth bass average length at age for the 2001 and 2004 surveys and the district average.

The largemouth bass Relative Stock Density (RSD) increased since 2001. In 2001 the RSD14 was 2 and the RSD18 was 0. Currently the RSD14 is 4 and the RSD18 is 1.

LOON PIT

ANGLER CREEL SURVEY

An estimated 537 anglers fished approximately 9,824 hours (47.69 hours per acre) from March 15 through November 8, 2004 (Table 4). The highest fishing pressure occurred in May (10.51 hours per acre) followed by July (8.11 hours per acre) and June (7.21 hours per acre). The lowest fishing pressure occurred in October (2.63 hours per acre).

Table 4. Estimated number of anglers, hours of fishing pressure, and overall harvest rates by month at Loon Pit, 2004.

Month	Number of Anglers	Fishing pressure (hours)	Harvest Rate (fish/hour)
March	51	492	0.00
April	51	1,226	0.21
May	89	2,165	0.03
June	94	1,486	0.04
July	93	1,670	0.01
August	79	1,231	0.06
September	49	875	0.04
October	22	541	0.04
November	9	138	0.47
Totals	537	9,824	0.06

The overall harvest rate was 0.06 fish per hour. The highest harvest rate was in November (0.47 fish per hour), followed by April (0.21 fish per hour). No fish were harvested in March, and July had the second lowest harvest rate of 0.01 fish per hour. The overall catch rate (harvested fish plus caught and released fish) was 0.38 fish per hour.

The total estimated harvest was 580 fish that weighed 355.38 pounds (Table 5). Crappie comprised 52% of the harvest by number followed by bluegill (24%), channel catfish (22%), redear sunfish (2%), and largemouth bass (1%). Channel catfish accounted for 66% of the harvest by weight followed by crappie, largemouth bass, bluegill, and redear sunfish.

Table 5. Estimated numbers and pounds of fish harvested at Loon Pit, 2004.

Species	Harvest by Number	Percent of Total	Harvest by Weight (lbs)	Percent of Total	Average Length (in)
Crappie	302	52.1	82.72	23.3	8.4
Bluegill	138	23.8	18.72	5.3	5.8
Channel catfish	125	21.6	235.05	66.1	17.3
Redear sunfish	11	1.9	3.05	0.9	7.3
Largemouth bass	4	0.7	15.84	4.5	19.5
Totals	580		355.38		

A total of 302 crappie was harvested that weighed 82.72 pounds. They ranged in length from 6.5 to 11.0 inches and averaged 8.4 inches. Only 8% of the harvested crappie were at least 10.0 inches long (Appendix B). Crappie were only harvested in the months of April (237 harvested) and November (65 harvested).

One hundred thirty eight bluegill were harvested that weighed 18.72 pounds. They ranged in length from 5.0 to 7.0 inches and averaged 5.8 inches. Seventy-seven percent of the bluegill harvest occurred in May and August.

A total of 125 channel catfish was harvested that weighed 235.05 pounds. They ranged in length from 13.0 to 23.0 inches and averaged 17.3 inches.

An estimated 11 redear sunfish and four largemouth bass were also harvested. Only one 19.5 inch largemouth bass was measured of the estimated four harvested.

An estimated 3,124 largemouth bass were caught and released. Bass less than 18 inches accounted for 99% of the total. May had the highest catch and release totals (1,113), followed by April (436), and June (405).

Largemouth bass were the most sought after species at Loon Pit. Forty-two percent of the respondents targeted largemouth bass followed by anglers indicating they were fishing for “anything” (34%), crappie (13%), bluegill (6%), and channel catfish (6%) (Figure 3).

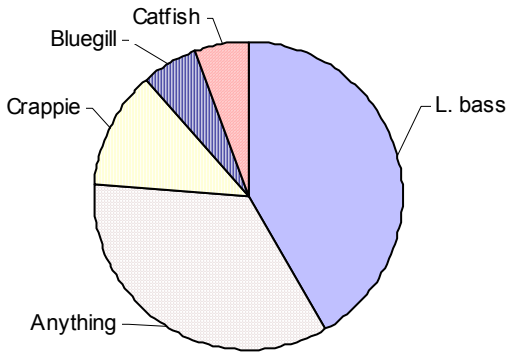

Figure 3. Fish species preferred by Loon Pit anglers.

Anglers from 12 of Indiana's 92 counties fished at Loon Pit during the creel period (Table 6). The majority of the anglers resided in Vanderburgh (64%) and Warrick (24%) Counties. Less than 5% of the anglers resided in each of the other 10 counties. Non-residents accounted for 1% of the anglers.

Table 6. Origin of anglers interviewed at Loon Pit, 2004.

County	No.	%
Vanderburgh	184	63.7
Warrick	69	23.9
Posey	14	4.8
Gibson	10	3.5
Pike	3	1.0
Non-resident	2	0.7
St. Joseph	1	0.3
Knox	1	0.3
Daviess	1	0.3
Dubois	1	0.3
Randolph	1	0.3
Vigo	1	0.3
Johnson	1	0.3

At the end of the interview, the clerk asked each party four questions. The responses to each question are as follows.

1. Are you in favor of the 18-inch largemouth bass length limit?

   Ninety percent of the anglers were in favor, 9% were not in favor, and 1% did not respond.

2. Are you in favor of the two bass bag limit?

   Eighty-nine percent of the anglers were in favor, 9% were not in favor, and 2% did not respond.

3. Were you satisfied with your fishing trip?

   Eighty-one percent of the anglers were satisfied, 6% were not satisfied, and 14% did not respond.

4. Would you be in favor of a muskie stocking program at Loon Pit?

   Fifty-eight percent of the anglers were in favor, 19% were not in favor, and 23% did not respond.

Fishing related expenditures such as, bait, tackle, food, license fee's, lodging, and transportation represent a monetary value for the Loon Pit fishery. The average cost for a fishing trip in Indiana was $36.56 per angler day in 2001 (U.S. Department of Interior, Fish and Wildlife Service, U.S. Department of Commerce, and U.S. Census Bureau, 2001). The $36.56 average was used for determining the economic value of Loon Pit's fishery. The estimated 537 anglers that fished the lake during the creel period represented an economic value of $19,632.72 for the fishery.

LARGEMOUTH BASS SURVEY

A total of 180 largemouth bass was collected that ranged in length from 4.0 to 16.2 inches, and weighed 72.84 pounds. The electrofishing catch rate was 45.0 per hour. Previous electrofishing catch rates were 17.0 (2000) and 13.0 per hour (2001) (these catch rates are lower due to summer sampling). Growth has slightly decreased for ages 1 and 2 bass since 2001 (Figure 4). Currently, growth for all ages is at the district average. Largemouth bass average weights were considered normal when compared to district averages.

The largemouth bass proportional stock density (PSD) was 6. In 2000 and 2001 the PSD was 17 and 13. The suggested range of bass PSDs indicating a healthy balanced fishery is 40 to 70 (Anderson and Neumann 1996).

CONCLUSIONS AND RECOMMENDATIONS

The best fishing at Blue Grass and Loon Pit was for crappie, channel catfish, and catch and release fishing for largemouth bass. Both pits provide good fishing opportunities with little crowding. The fishing pressure at Blue Grass Pit is considered moderate, while Loon Pit was low.

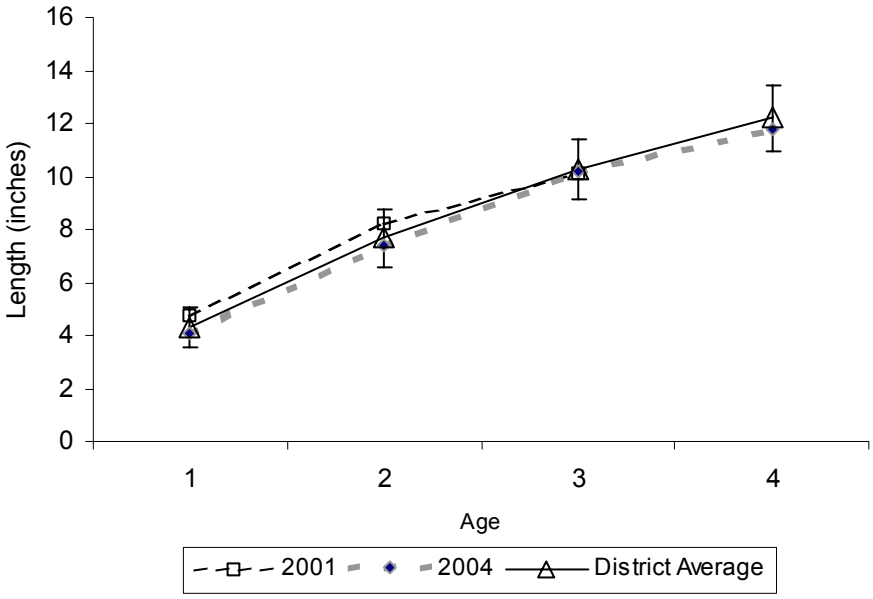

Figure 4. Loon Pit largemouth bass average length at age for the 2001 and 2004 surveys and the district average.

Blue Grass Pit was the better of the two lakes for harvesting fish. Harvest at Blue Grass Pit was higher for all species, with the largest difference found in the crappie harvest (2,780 versus 302). Crappie at Loon Pit appear to be underutilized. In 2001, crappie were collected in trap nets at a rate of 10.3 per lift at Loon Pit and 8.5 per lift at Blue Grass Pit. Crappie growth for all ages was below the district average. Growth would likely increase with increased harvest. Crappie fishing should continue to be good at Blue Grass Pit and Loon Pit, particularly in the spring and fall.

It is recommended that a spring crappie trap netting survey be conducted at Blue Grass Pit, Loon Pit, and Otter Pit in 2006 and 2007 to more accurately describe the changes in the crappie population. This information would be valuable to anglers and would shed some light on the crappie fishing potential of these pits.

Largemouth bass was the focus of most anglers at both pits. However, they contributed very little to the harvest. The total expanded bass harvest was 14 at Blue Grass Pit and four at Loon Pit. The low harvest rate is expected with the 18-inch size limit. Relatively few bass were harvested (0.15 fish per hour) at Blue Grass Pit compared to the number caught and released (0.37 fish per hour). Loon Pit showed similar results when comparing catch and release bass fishing (0.32 fish per hour) and the total harvest rate (0.06). As the largemouth bass fishery improves, fishing pressure will likely increase at both pits.

It is too early to draw conclusions on how the 18-inch length limit and two bass bag limit has affected the largemouth bass population. The changes in growth, stock densities, and electrofishing catch rates are most likely due to the 14-inch size limit and five bass bag limit that was in effect from 2000 to 2003. Future work is planned through 2009 with four largemouth bass surveys (2005, 2006, 2007, and 2009) and one angler creel survey (2006).

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Submitted by: Jason C. Doll, Assistant Fisheries Biologist
Date: February 15, 2005

Approved by: Daniel P. Carnahan, Fisheries Biologist

Approved by: _____
Brian M. Schoenung, Fisheries Supervisor
Date: May 2, 2005

Appendix A. Length frequency distribution of harvested fish observed from Blue Grass Pit, 2004.

Length	Crappie		Channel catfish		Bluegill		Largemouth bass	
(inches)	Number	%	Number	%	Number	%	Number	%
5					2	14.3		
5.5					4	28.6		
6					3	21.4		
6.5					4	28.6		
7	5	1.2			1	7.1		
7.5	16	3.8						
8	133	31.2						
8.5	92	21.6						
9	89	20.9						
9.5	31	7.3						
10	33	7.7						
10.5	4	0.9						
11	9	2.1						
11.5	1	0.2						
12	6	1.4						
12.5	3	0.7						
13	3	0.7	1	7.1				
13.5								
14	1	0.2						
14.5								
15								
15.5								
16			1	7.1				
16.5								
17			2	14.3				
17.5								
18								
18.5								
19			1	7.1				
19.5			1	7.1				
20			2	14.3			1	100.0
20.5								
21			1	7.1				
21.5								
22			1	7.1				
22.5								
23			2	14.3				
23.5			1	7.1				
24								
24.5								
25								
25.5								
26								
26.5								
27			1	7.1				
Totals	426		14		14		1	

Appendix B. Length frequency distribution of harvested fish observed from Loon Pit, 2004.

Length	Crappie		Bluegill		Channel catfish		Largemouth bass	
(inches)	Number	%	Number	%	Number	%	Number	%
5			2	11.1				
5.5			7	38.9				
6			7	38.9				
6.5	1	2.5	1	5.6				
7	2	5.0	1	5.6				
7.5	2	5.0						
8	12	30.0						
8.5	17	42.5						
9	3	7.5						
9.5								
10	1	2.5						
10.5	1	2.5						
11	1	2.5						
11.5								
12								
12.5								
13					2	12.5		
13.5					1	6.3		
14					1	6.3		
14.5								
15					1	6.3		
15.5								
16								
16.5					2	12.5		
17					3	18.8		
17.5								
18					1	6.3		
18.5								
19								
19.5					1	6.3	1	100.0
20					1	6.3		
20.5								
21								
21.5					1	6.3		
22					1	6.3		
22.5								
23					1	6.3		
Totals	40		18		16		1	

APPENDIX C

BLUE GRASS PIT LARGEMOUTH BASS SURVEY DATA

APPENDIX D

LOON PIT LARGEMOUTH BASS SURVEY DATA